CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Jake Friedman; Daniel Moyer

Project Number
J0712

Project Title
What's in a Tesla Coil?

Abstract

Objectives/Goals
To build a functional Tesla coil and to understand how a Tesla coil works.

Methods/Materials
Using a design found on the internet (http://privat.schlund.de/s/skluge/sub1.htm # Stefan's Tesla-pages), we constructed our Tesla coil (originally invented by Nikola Tesla) using a commercially available transformer, a configuration of capacitors individually rated for 7.5 kV, a primary coil of 3/8 and ¼ inch copper tubing, a secondary coil hand wound with 29awg magnet wire, a spark gap constructed using 1 inch diameter copper pipe, a drain cover, and a muffin fan, a toroid constructed using aluminum duct pipe, and a control board designed by a parent experienced in high voltage design.

Results
Tuning and adjusting the Tesla coil were the most difficult components of this project. We were able to tune the coil with one active gap (in the spark gap) and generate sparks and other phenomena characteristic to Tesla coils. Reconfiguration and replacement of some parts was required for the coil to run with two active gaps. Attempting to add additional gaps and subsequently increase the input voltage resulted in an arc-over in the capacitor bank.

Conclusions/Discussion
Once the primary coil was correctly tuned, the Tesla coil produced sparks up to ten centimeters long and cause a nearby fluorescent light to glow due to the coil's inductive field.

Summary Statement
In this project, we built and tuned a Tesla coil, which produced sparks and other electromagnetic effects.

Help Received
Father (Geoff Moyer) designed and built Control board and supervised test-run of the Tesla coil